

### **REMARKS**

With the foregoing amendment claims 1-5, 7-9, and 12-28 are pending in the application. Claims 1, 3 and 16 are independent. No new matter has been added by the amendments. Applicants respectfully request reconsideration of the present application.

#### **Double Patenting**

Claims 3 and 12-15 are provisionally rejected under the doctrine of obviousness type double patenting as being unpatentable over claims 1, 3-7 of application No. 09/908,019. Application No. 09/908,019 is abandoned. Accordingly, Application No. 09/908,019 is not pending. Thus, the double patenting rejection should be withdrawn.

#### **Claim Rejection Under 35 U.S.C. § 112**

Claim 3 stands rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. To avoid any potential for ambiguity, claim 3 is amended herein. Applicant submits that claim 3 as amended is not indefinite.

#### **Rejection of Claims based on Bacs (US 5,678,089)**

Claims 1, 2, 4, 5, 7-9 and 16-22 stand rejected under 35 U.S.C. § 102 as being anticipated by Bacs (US 5,678,089). Applicant respectfully traverses.

##### **Claim 1:**

With respect to claim 1, claim 1 is not anticipated by Bacs because Bacs does not disclose all of the features of claim 1 as amended herein. For example, at the least, Bacs does not disclose:

A digital image capturing device ... comprising ...  
a processor that (a) allows a user to select one of [a]  
plurality of exposure patterns, (b) applies the selected exposure  
pattern to said shutter device in response to activation of [a]  
shutter button ..., and (c) records on a storage device only a  
single image of the object as a result of the complete  
application of the exposure pattern [i.e., in response to  
activation of the shutter button].

as is recited in claim 1, as amended.

First, as discussed in the Reply to the previous Office Action, Bacs does not disclose a digital imaging capturing device that “records only a single image as a result of the complete application of the exposure pattern [i.e., in response to activation of the shutter button],” as is required by claim 1.

Bacs discloses an autostereoscopic camera that uses a “parallax scanning pattern” to record a plurality of images. When these plurality of images are successively displayed, the succession of images produce an autostereoscopic image of said object on a conventional, two-dimensional display. For example, the Abstract of Bacs states, “**Images** of a scene being photographed, as viewed through the lens aperture in its various disparity positions, are recorded for subsequent display, which produces a three dimensional illusion when viewed on a conventional display with the unaided eye.” *Bacs Abstract* (emphasis added). Throughout the entire disclose of Bacs, Bacs makes clear that more than one image is recorded as a result of the complete excursion of the “parallax scanning pattern.” For example Bacs states,

To achieve these objectives and advantages, the improved single-camera autostereoscopic imaging method of the present invention comprises the steps of providing an imaging lens having an optical axis directed toward a scene, providing a lens aperture, moving the aperture relative to the lens in a parallax scanning pattern through diverse disparity points displaced from the optical axis of the lens, **generating a succession of time-spaced images of the scene** as viewed through the aperture from a plurality of the disparity points, and **recording the images**.

*Bacs*, col. 3, ll. 19-29 (emphasis added). See also, col. 5, ll. 34-38 (“In the embodiment of the autostereoscopic imaging apparatus of the present invention disclosed in FIGS. 1-8 **a succession of time-spaced images of a scene are recorded** by a single imaging device in a manner such that a subsequent display of the images can be perceived as three-dimensional.”) (emphasis added); col. 8, ll. 58-67 (“A parallax scanning cycle corresponds to a complete excursion of a particular parallax scanning pattern by the lens aperture starting from an arbitrary position in the pattern and returning to the same arbitrary position, which

is also the starting position of the next scanning cycle. During each parallax scanning cycle, **IMAGES** are recorded at the frame rate of the imaging device, normally 24 frames per second (fps) in the case of a film camera ....”) (emphasis added); and *col. 11, ll. 17-19* (“the rendered **images** are stored in computer memory on a frame-by-frame basis (step 108). The stored **images** can then be retrieved from memory for display on a computer monitor ....”).

It is **impossible** for Bacs to achieve its objective of producing three dimensional looking images if the camera disclosed in Bacs recored only a single image as a result of a complete excursion of a parallax scanning pattern (i.e., in response to activation of the shutter button). That is why throughout the entire disclosure, Bacs discloses that “images,” as opposed to “a single image,” are recorded. Because It is **impossible** for Bacs to achieve its objective of producing three dimensional looking images if the camera disclosed in Bacs records only a single image in response to a complete excursion of a parallax scanning pattern, Bacs can not and does not disclose “a processor that ... records on a storage medium only a single image of the object as a result of the complete application of the exposure pattern,” as is required by claim 1. Thus, Bacs does not anticipate claim 1. The rejection of claim 1, therefore, should be withdrawn, as well as the rejection of the claims that depend from claim 1.

Claim 16:

With respect to claim 16, the above remarks for claim 1 apply because, like claim 1, claim 16 requires, “a processor that (a) allows a user to select one of said stored plurality of exposure patterns, (b) completely applies the selected exposure pattern to said shutter device in response to activation of a shutter button to allow light reflected from the object whose image is to be captured to illuminate said imaging sensor through said selected exposure pattern, and (c) records on a storage device only a single image of the object as a result of the complete application of the selected exposure pattern.”

Claim 21:

Bacs does not anticipate claim 21 because Bacs does not disclose, either explicitly or inherently, that the parallax scanning pattern “specifies a first exposure time period for [a] first group of shutter elements and a second exposure time period for [a] second group of shutter elements, wherein the first exposure time period is greater than the second exposure time period,” as is required by claim 21. The Examiner admits that Bacs does not “directly state” this feature of claim 21. However, the Examiner contends that this feature of claim 21 is inherent in Bacs or implied by Bacs. The Examiner’s contention lacks merit.

The Examiner appears to be basing his contention on the following passage from Bacs:

rather than moving a single aperture in a parallax scanning pattern through different disparity positions, an equivalent parallax scanning pattern can be achieved by utilizing an optical element or combination of optical elements controlled to create momentary lens apertures at various disparity positions vertically, horizontally and/or both horizontally and vertically offset from the lens optical axis. Using this approach, the optical element or elements can function as the camera shutter, as well as the lens aperture. The optical element of FIG. 8 is particular suited for this approach to the practice of the present invention.

*Bacs, col. 15, ll. 40-50.*

However, the mere fact that Bacs discloses creating “momentary lens apertures at various disparity positions vertically, horizontally and/or both horizontally and vertically offset from the lens optical axis,” does not imply that the first momentary lens aperture at the first disparity position has associated with it a “first exposure time period,” and the second momentary lens aperture at the second disparity position has associated with it a “second exposure time period,” wherein the first exposure time period is greater than the second. There is simply nothing in the above passage or anywhere else in Bacs to suggest that different “momentary lens apertures” have different exposure time periods. In fact, the opposite is suggested. That is, one skilled in the art would assume that all of the “momentary lens apertures” have the same exposure time period because to do otherwise would create a first image of the object having one exposure and a second image of the same

object having a different exposure. There is nothing in Bacs to suggest having two different time exposures for the same object.

Thus, while Bacs discloses momentary lens apertures, Bacs does not disclose that one of the momentary lens apertures has a different exposure time than another momentary lens aperture. Accordingly, Bacs does not disclose a pattern that “specifies a first exposure time period for [a] first group of shutter elements and a second exposure time period for [a] second group of shutter elements, wherein the first exposure time period is greater than the second exposure time period,” as is required by claim 21. Thus, Bacs does not anticipate claim 21. The rejection of claim 21, therefore, should be withdrawn.

**Rejection of Claims based on Satorius (US 6,026,053)**

Claims 3 and 12-14 stand rejected under 35 U.S.C. § 102 as being anticipated by Satorius (US 6,026,053). Applicant respectfully traverses.

With respect to claim 3, claim 3 is not anticipated by Satorius because Satorius does not disclose all of the features of claim 3. For example, at the least, Satorius does not disclose:

a shutter device comprising a plurality of shutter element pairs, wherein each pair of shutter elements consists of a first individually addressable shutter element having a first polarization orientation and a second individually addressable shutter element having a second polarization orientation that is substantially orthogonal to said first polarization orientation,

as is required by claim 3.

Satorius discloses a pair of “transform shutter elements 102” (see FIG. 5). As is illustrated in FIG. 5 of Satorius, the pair of transform shutter elements 102 consists of a first shutter element and a second shutter element. However, nowhere does Satorius disclose that the first shutter element has a first polarization orientation and the second shutter element has a second polarization orientation that is substantially orthogonal to said first polarization orientation, as is required by claim 3.

With respect to shutter elements 102, Satorius discloses the following:

The transform plane shutter array 100 consists of a plurality of independently controlled and electronically addressed shutter

elements 102 arranged in a predetermined pattern that corresponds to the locations of the transformed data pages 106. The transform plane shutter array 100 is located at the focal plane of the lenslets 92 and controls the passage of the quasi-monochromatic light from the various transformed data pages 106. Only light from one of the many transformed data pages 106 is passed through a shutter element 102 of the transform plane shutter array 100 at any one time. .... The transform plane shutter array 100 is electronically controlled through a register, which in turn is controlled by a computer. The computer energizes a particular light emitter 52 within the quasi-monochromatic light source 50 and the light is projected through the corresponding book 80 of data and its corresponding lenslet 92. The various data pages 74 are then transformed at various spatial locations in the spatial frequency plane 104. The computer then opens a particular shutter element 102 in the transform plane shutter array 100, deployed in the spatial frequency plane 104, and corresponding to the desired transformed data page 106. The light then passes through the shutter element 102 and is reimaged onto the photodetector array 140.

The transform plane shutter array 100, as shown in FIGS. 5 and 6, uses a magneto-optic spatial light modulator (MOSLM) containing transform shutter elements 102. The MOSLM is preferred over a liquid crystal modulator (LCM) because the switching speed is faster and the on/off contrast ratios are higher. Both of the technologies are well known in the optical community. The MOSLM is sandwiched between two sheet polarizers of the dichroic type, a polarizer 190 and analyzer 180. The polarizer 190 can be eliminated, as shown in FIG. 6 if the impinging light is already linearly polarized. The polarization axis of the polarizer 190 is orthogonal to the polarization axis of analyzer 180. When a specific MOSLM transform shutter element 102 is energized, the polarization of the light passing through the element will be rotated 90 degrees, thereby allowing it to pass thorough the analyzer 180 unattenuated. The unenergized transform shutter elements 102 will not rotate the polarization of the light and the analyzer 180 will significantly attenuate the light. Each of the transform shutter elements 102 within the spatial frequency plane shutter array 100 shall be of a size equal to the area of a transformed data page 106. The location of each transform shutter element 102 corresponds to the location of the transformed data page 106 as shown in FIG. 4 for each lenslet.

Satorius, col. 14, ll. 18-62.

Nowhere in the above passage from Satorius does Satorius disclose that the pair of shutter elements 102 shown in FIG. 5 have orthogonal polarization orientations. In fact, the above passage indicates that all of the shutter elements 102 are identical. More specifically, Satorius discloses that all of the shutter elements function to rotate by 90 degrees the light passing through the element. *See col. 14, ll 56-60* (“When a specific MOSLM transform shutter element 102 is energized, the polarization of the light passing through the element will be rotated 90 degrees, thereby allowing it to pass thorough the analyzer 180 unattenuated.”). Because Satorius does not disclose that the pair of shutter elements 102 shown in FIG. 5 have orthogonal polarization orientations, Satorius does not anticipate claim 3. The rejection of claim 3, therefore, should be withdrawn, as well as the rejection of the claims that depend from claim 3.


#### **New Claims**

New claims 23-28 are added. Claims 23 and 24 depend from claim 1 and claims 25-28 depend from claim 16. Accordingly, these claims are patentable for at least the reasons given above with respect to claims 1 and 16.

**CONCLUSION**

All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider all presently outstanding objections and rejections, and that they be withdrawn. Applicant believes that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance.

If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

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